

SUPPORT FOR THE AMENDMENTS

Support for the amendment of Claims 8, 27, 54 and 55 is found in the specification on page 5, line 31 [(b1) molecular weight 800 to 5000)], page 6, lines 31-34 [terminal structural unit $-\text{CH}_2\text{OH}$], and page 8, line 31 [fraction of $(-\text{CH}_2\text{CH}_2-\text{O}-)$ at least 5% by weight].

Claims 8, 27, 54 and 55 are amended to use wording and structure more consistent with U.S. patent law practice.

Claims 26, 29, 34, 45 and 46 are amended to use proper antecedent reference and to more clearly describe the invention.

No new matter is believed added to this application by entry of this amendment.

Claims 8-9, 22-23, 25-31, 33-38, 40-56 are active.

REMARKS/ARGUMENTS

The claimed invention provides emulsion polymerization processes according to Claims 8, 27, 54 and 55, for directly preparing dispersions of self-emulsifying polyurethanes without the need for or use of high shearing forces. In order to have a self-emulsifying character in an aqueous system, the polyurethane according to the claimed invention contains at least 5% by weight of ethyleneoxy units and optionally (depending on the particular claimed process) an ionic group. It is the presence of these groups at 5% by weight or more which imparts sufficient hydrophilic character to the polyurethane to render the polyurethane self-emulsifying. No such process to directly prepare, via emulsion polymerization and without high shear, a polyurethane dispersion having an average particle size of less than 100 nm is disclosed or suggested in the cited references.

The rejection of Claims 8-9, 21-38 and 40-56 under 35 U.S.C. 112, first paragraph, is respectfully traversed.

Applicants submit that as indicated in Example 1 on page 16 of the specification, the OH number of the polyol b1) was determined according to DIN 53240 (translated copy attached). According to this standard titration method, a sample of the polymer material is acetylated with acetic anhydride and the acid formed titrated with standard KOH. The OH number reported as mg KOH required to titrate the acid released by acylation of 1 gram of the polymer is mathematically related to the molecular weight of the polymer sample on the basis of molar equivalency.

For example, in Example 1, the OH number is 26.7 mg KOH. This experimental value indicates a molecular weight of the polymer by the following mathematical operation.

The formula weight of KOH is 56. Therefore 26.7 mg is equivalent to 0.00048 mole KOH ($0.0267/56$). The block copolymer of Example 1 must have two terminal –OH groups per mole. Therefore, 1g of sample must be 0.00024 mole and the molecular weight of the polymer is determined to be 4167 ($1/.00024$).

The DIN test procedure requires that the KOH titration be run at least in duplicate and as is standard procedure in such an analytical procedure, the result is reported as an average value of the number of titrations made. This constitutes by definition, a number average value and fully supports Applicants use of number average molecular weight. If multiple titrations are made and molecular weight calculations completed as shown above for each titration value, the sum of the values divided by the number of titrations run provides a number average molecular weight. Applicants respectfully submit the foregoing analysis and explanation is understood by one of ordinary skill in chemistry and is based on principles taught at an introductory level of general chemistry.

Applicants point to the MPEP § 2163 I. which states:

To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention.

Applicants submit that as demonstrated above, one of ordinary skill in the art would recognize the relationship of a KOH number via DIN 53240, a standard test procedure known in the industry, and molecular weight determination.

Applicants further note that MPEP § 2163 B. states:

While there is no *haec verba* requirement, newly added claim limitations must be supported in the specification through express, implicit, or inherent disclosure.

Applicants have shown above that number average molecular weight determination is implicit and/or inherent to the disclosure of DIN 53240 based on simple chemical mathematical relationship of moles, mass and molecular weight. The titration test is run at least in duplicate and therefore, only a number average value can be reasonably obtained.

Finally, Applicants respectfully point to MPEP § 2163 II. 2. which provides the following guidance:

The analysis of whether the specification complies with the written description requirement calls for the examiner to compare the scope of the claim with the scope of the description to determine whether applicant has demonstrated possession of the claimed invention. Such a review is conducted from the standpoint of one of skill in the art at the time the application was filed.

Applicants submit that as shown above the support for use of number average molecular weight is supported and would be understood by one of ordinary skill in the art at the time of the invention.

In view of all the above, Applicants respectfully request that the rejection of Claims 8-9, 21-38 and 40-56 under 35 U.S.C. 112, first paragraph, be withdrawn.

The rejection of Claims 8-9, 21-38 and 40-56 under 35 U.S.C. 103(a) over Licht et al. (WO 02/064657 equivalent to US 2004/0077777) in view of Jakubowski et al. (U.S. 5,959,027) and Scriven et al. (U.S. 4,046,729) is respectfully traversed.

Licht describes a method to directly prepare aqueous primary dispersion of a **hydrophobic** polyurethane (Abstract), in miniemulsions without the intermediate preparation of a prepolymer ([0010]). Licht describes the advantages of his method to include 1) no preparation of a prepolymer and 2) no incorporation of ionically or non-ionically hydrophilic groups ([0014]). Licht further defines a hydrophobic polyurethane as follows [0015]:

Accordingly, in the context of the present invention, the property of being hydrophobic is understood as the constitutional property of a molecule or functional group to behave exophilically with respect to water, i.e., they exhibit the tendency not to penetrate water or else to depart the aqueous phase.

Licht further describes that the miniemulsions are formed by use of high-pressure homogenizers by means of high local energy input ([0040]). Paragraphs [0040 and 0041] describe specialized **high shear** gradient equipment which can prepare the miniemulsion required and sought by Licht.

The Office cites Jakubowski to show preparation of polyisocyanates having ionic functionalities (Official Action dated January 23, 2009, page 5, lines 14-22). Jakubowski describes a process for forming a polyurethane/urea/thiourea latex by (Col. 1, lines 56-):

a) **forming** by a continuous process a high internal phase ratio (HIPR) emulsion of a polyurethane/urea/thiourea **prepolymer** in the presence of water and an emulsifying and stabilizing amount of a surfactant; and b) contacting the high internal phase ratio emulsion with a chain-extending reagent under such conditions to form the polyurethane/urea/thiourea latex; . . . (Bold added for emphasis)

Scriven is cited to show stable dispersion of polyurethane through incorporation of alkylene oxide moieties (Official Action dated January 23, 2009, page 6, lines 10-22).

Scriven describes a process for preparing a water-diluted, ungelled, non-sedimenting polyurethane via adding curing agents to a **prepolymer** (Abstract).

The Office alleges that it would have been obvious to one of ordinary skill in the art to modify the Licht process to incorporate elements from each of the secondary references to

obtain the claimed invention. However, Applicants submit that each of the secondary references requires preparation via a prepolymer stage, a stage Licht specifically eliminates and each of the secondary references incorporates hydrophilic constituents sufficient to render hydrophilic character to the polyurethane. In contrast, Licht specifically defines his polyurethane as hydrophobic and describes an advantage of his process to be that such materials are not employed.

Applicants respectfully note *In re Ratti*, as follows:

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)

Applicants submit that Licht clearly states his objective to eliminate the formation of prepolymers, to not use materials having ionic or non ionic hydrophilic groups and to prepare a hydrophobic polyurethane. However, each of the modifications alleged by the Office to be obvious based on the disclosures of the secondary references reverses or ignores the stated objective and principle of operation stated by Licht. In consideration of the above statement from *In re Ratti*, Applicants submit that such modification is not sufficient to support a *prima facie* case of obviousness.

Moreover, in a discussion of “**Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.***” the Office has stated:

The rationale to support a conclusion that the claim would have been obvious is that **all the claimed elements were known in the prior art** and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art at the time of the invention. “[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” **If any of these findings cannot be made, then this rationale cannot be used to support a conclusion that the claim would have been obvious to one of ordinary skill in the art, . . .** (Federal Register, Vol. 72, No. 195, page 57529) (Bold added) (Citations omitted)

Applicants note that Claims 8, 27, 54 and 55 are herein amended to recite a content of the fraction of the structural units $[-CH_2-CH_2-O-]$ is at least 5% by weight, i.e., further definition of the hydrophilic character of the polymer according to the claimed invention. Nowhere, does Licht disclose such character and any modification of Licht to have such hydrophilic property is improper (M.P.E.P. 2143.01 V. and VI.).

Accordingly, Applicants submit that a conclusion of obviousness cannot be supported.

Applicants submit that as described above, the cited references cannot be properly combined and the description of the cited reference combination does not make all the elements of the claimed method known without change in principle of operation. Accordingly, a conclusion of obviousness cannot be supported and Applicants respectfully request that the rejection of Claims 8-9, 21-38 and 40-56 under 35 U.S.C. 103(a) over Licht in view of Jakubowski and Scriven be withdrawn.

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Applicants respectfully submit that the above-identified application is now in
condition for allowance and early notice of such action is earnestly solicited.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read "Jay E. Rowe", is written over a horizontal line.

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